

HISTORIC COLUMBIA RIVER HIGHWAY,
TOOTHROCK & EAGLE CREEK VIADUCTS
Troutdale vicinity
Multnomah County
Oregon

HAER No. OR-36-N

HAER
ORE
26-TROUT, V
IN-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

HISTORIC COLUMBIA RIVER HIGHWAY,
TOOTHROCK AND EAGLE CREEK VIADUCTS

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Location: Curving around a promontory near Tooth Rock, west of Eagle Creek along an abandoned section of the Historic Columbia River Highway, Multnomah County, Oregon, beginning at mile post 42.24.

UTM: 10/582960/5054200
10/583170/5054240
Quad: Bonneville Dam, Wash.--Oreg.

Date of Construction: 1915

Engineer: K. P. Billner or Lewis W. Metzger, designing engineers, Oregon State Highway Department

Builder: Unknown; probably the Pacific Bridge Company or The Construction Company, both of Portland

Owner: Oregon Department of Transportation

Present Use: Abandoned, 1937

Significance: One of several half viaducts constructed on the Historic Columbia River Highway. Part of the first section of the route made redundant by a new water-level grade for U.S. 30, later a portion of Interstate 84.

Historian: Robert W. Hadlow, Ph.D., September 1995

Transmitted by: Lisa M. Pfueller, September 1996

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PROJECT INFORMATION

This recording project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. The HAER program is administered by the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Division of the National Park Service, U.S. Department of the Interior. The Historic Columbia River Highway Recording Project was cosponsored in 1995 by HABS/HAER, under the general direction of Robert J. Kapsch, Ph.D., Chief, and by the Oregon Department of Transportation (ODOT), Bruce Warner, Region One Manager; in cooperation with the US/International Committee on Monuments and Sites (ICOMOS), the American Society of Civil Engineers (ASCE), and the Historic Columbia River Highway Advisory Committee.

Fieldwork, measured drawings, historical reports, and photographs were prepared under the direction of Eric N. DeLony, Chief of HAER; Todd A. Croteau, HAER Architect, and Dean A. Herrin, Ph.D., HAER Historian. The recording team consisted of Elaine G. Pierce (Chattanooga, Tennessee), Architect and Field Supervisor; Vladimir V. Simonenko (ICOMOS/Academy of Fine Arts, Kiev, Ukraine), Architect; Christine Rumi (University of Oregon) and Pete Brooks (Yale University), Architectural Technicians; Helen I. Selph (California State Polytechnic University, Pomona) and Jodi C. Zeller (University of Illinois, Urbana-Champaign), Landscape Architectural Technicians; Robert W. Hadlow, Ph.D. (ASCE/Pullman, Washington), Historian; and Jet Lowe (Washington, DC), HAER Photographer. Jeanette B. Kloos, ODOT Region One Scenic Area Coordinator; and Dwight A. Smith, ODOT Cultural Resources Specialist, served as department liaison.

Additional information about the Historic Columbia River Highway can be found under the following HAER Nos.:

OR-36	HISTORIC COLUMBIA RIVER HIGHWAY
OR-36-A	HISTORIC COLUMBIA RIVER HIGHWAY, SANDY RIVER BRIDGE AT TROUTDALE
OR-36-B	HISTORIC COLUMBIA RIVER HIGHWAY, SANDY RIVER BRIDGE (Stark St. Bridge)
OR-36-C	HISTORIC COLUMBIA RIVER HIGHWAY, CROWN POINT VIADUCT
OR-36-D	HISTORIC COLUMBIA RIVER HIGHWAY, CROWN POINT
OR-24	LATOURELL CREEK BRIDGE
OR-23	SHEPPERDS DELL BRIDGE
OR-36-E	HISTORIC COLUMBIA RIVER HIGHWAY, BRIDAL VEIL FALLS BRIDGE

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OR-36-F HISTORIC COLUMBIA RIVER HIGHWAY, WAHKEENA FALLS
FOOTBRIDGE
OR-36-G HISTORIC COLUMBIA RIVER HIGHWAY, WEST MULTNOMAH FALLS
VIADUCT
OR-36-H HISTORIC COLUMBIA RIVER HIGHWAY, MULTNOMAH CREEK BRIDGE
OR-36-I HISTORIC COLUMBIA RIVER HIGHWAY, MULTNOMAH FALLS
FOOTBRIDGE (Benson Footbridge)
OR-36-J HISTORIC COLUMBIA RIVER HIGHWAY, EAST MULTNOMAH FALLS
VIADUCT (Bridge No. 841)
OR-36-K HISTORIC COLUMBIA RIVER HIGHWAY, ONEONTA GORGE CREEK
BRIDGE
OR-36-L HISTORIC COLUMBIA RIVER HIGHWAY, ONEONTA TUNNEL
OR-36-M HISTORIC COLUMBIA RIVER HIGHWAY, HORSETAIL FALLS BRIDGE
OR-49 MOFFETT CREEK BRIDGE
OR-36-O HISTORIC COLUMBIA RIVER HIGHWAY, TOOTHROCK TUNNEL
OR-36-P HISTORIC COLUMBIA RIVER HIGHWAY, EAGLE CREEK BRIDGE
OR-36-Q HISTORIC COLUMBIA RIVER HIGHWAY, EAGLE CREEK RECREATION
AREA (Forest Camp)
OR-36-R HISTORIC COLUMBIA RIVER HIGHWAY, MITCHELL POINT TUNNEL
& VIADUCT (Tunnel of Many Vistas)
OR-36-T HISTORIC COLUMBIA RIVER HIGHWAY, MOSIER TWIN TUNNELS
OR-36-U HISTORIC COLUMBIA RIVER HIGHWAY, MOSIER CREEK BRIDGE
(Bridge No. 498)
OR-30 DRY CANYON CREEK BRIDGE
OR-27 MILL CREEK BRIDGE

OR-56 COLUMBIA RIVER HIGHWAY BRIDGES

For shelving purposes at the Library of Congress, Troutdale
vicinity in Multnomah County was selected as the "official"
location for the various structures in the Historic Columbia
River Highway documentation project (HAER No. OR-36).

HISTORIC COLUMBIA RIVER HIGHWAY

The Pacific Northwest's Columbia River Highway, later renamed the Historic Columbia River Highway (HCRH), was constructed between 1913 and 1922. It is one of the oldest scenic highways in the United States. Its design and execution were the products of two visionaries: Samuel Hill, lawyer, entrepreneur, and good roads promoter, and Samuel C. Lancaster, engineer and landscape architect, with the assistance of several top road and bridge designers. In addition, many citizens provided strong leadership and advocacy for construction of what they saw as "The King of the Roads."

Often, the terms "scenic highways" and "parkways" are used synonymously. Scenic highways are best described as those roads constructed to provide motorists with the opportunity to see up-close the landscape's natural beauty. Parkways are roads or streets often associated with city beautiful campaigns prevalent in the United States in the late 19th and early 20th centuries. They were part of a movement to create park-like settings out of wastelands. Many of the scenic highways in the United States are associated with the country's national park system and were built in the years following the First World War.

Beginning in the 1910s and early 1920s, the National Park Service (NPS) began construction of well-engineered paved roads with permanent concrete and masonry bridges and viaducts to make its park sites more accessible to an increasingly mobile tourist population. These included roads such as "Going-to-the-Sun Highway" in Glacier National Park and "All-Year Highway" in Yosemite National Park. The Historic Columbia River Highway, unlike many of its counterparts, was constructed through county-state cooperation. It became a state-owned trunk route or highway, part of a growing system of roads that criss-crossed Oregon.

Samuel Hill, once an attorney for James J. Hill and his large railroad empire, and later a Pacific Northwest investor and entrepreneur, was the state of Washington's most vocal good roads' spokesman in the late 19th and early 20th centuries. He promoted good roads at Seattle's Alaska-Yukon-Pacific Exposition in 1905, and shortly thereafter helped to establish the department of highway engineering at the University of Washington. With little success in convincing the Washington State Legislature to fund a major highway along the Washington side of the Columbia River, Hill found more receptive ears and pocketbooks with Oregon lawmakers and Portland area businessmen. Construction began on the Historic Columbia River Highway in

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1913. By 1922, it was complete, covered in a long-wearing and smooth-riding asphaltic-concrete pavement.¹

Hill hired Samuel Lancaster, an experienced engineer and landscape architect to design the HCRH. Lancaster was noted for the boulevards that he created around Seattle's Lake Washington in the first decade of the 20th century as a component of the city's Olmsted-designed park system. In 1909 Lancaster became the first professor of highway engineering in Hill's department at the University of Washington. Lancaster had accompanied Hill and others to Paris in 1908 for the First International Road Congress, and afterwards the delegation toured western Europe to learn about continental road-building techniques. Seeing roads in the park-like setting of the Rhine River Valley inspired Hill to build a highway along the Columbia River Gorge. By 1912, Lancaster was conducting road-building experiments at Hill's estate, Maryhill, 100 miles east of Portland on the Washington side of the Columbia. The route they subsequently created was not a parkway, in the truest sense, but instead a scenic highway.²

The Columbia River Gorge's natural features distinguish it as an ideal setting. This relationship between the natural landscape and the Historic Columbia River Highway was described best by locating engineer John Arthur Elliott. He wrote, "All the natural beauty spots were fixed as control points and the location adjusted to include them." The road passed several waterfalls and rock outcroppings, including Thor's Heights (Crown Point), Latourell Falls, Shepperd's Dell, Bishop's Cap, Multnomah Falls, Oneonta Gorge and Falls, Horsetail Falls, Wahkeena Falls, and Tooth Rock. Natural features were made an integral component of the Historic Columbia River Highway.³

According to Lancaster, "There is but one Columbia River Gorge [that] God put into this comparatively short space, [with] so many beautiful waterfalls, canyons, cliffs and mountain domes." He believed that "men from all climes will wonder at its wild grandure [sic] when once it is made accessable [sic] by this great highway." In addition, the promoters sought to create a route that utilized the most advanced techniques available for road construction. In reflecting on the work's progress, Lancaster acknowledged that because of the country's rugged climate, with its wind and rain and winter weather, it had been "slow and tedious and somewhat more expensive than ordinary work." Nevertheless, he and his associates felt they were accomplishing a worthwhile task because, "for if the road is completed according to plans, it will rival if not surpass anything to be found in the civilized world."⁴

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In an more practical light, many observers saw the Historic Columbia River Highway as a lifeline connecting Portland with the many commercial and agricultural areas along the Columbia River. Some even envisioned it as part of a spider web of similarly constructed routes radiating out towards central and eastern Washington and northern Idaho, meeting routes leading to other parts of the region and nation.

The Historic Columbia River Highway was a technical and civic achievement of its time, successfully mixing sensitivity to the magnificent landscape and ambitious engineering. The highway has gained national significance because it represents one of the earliest applications of cliff-face road building as applied to modern highway construction. Lancaster emulated the European styles of road building in the Columbia River Gorge, while also designing and constructing a highway to advanced engineering standards. Throughout the route, engineers held fast to a design protocol that included accepting no grade greater than 5 percent, nor laying out a curve with less than a 200' turning radius. In rare cases where a tighter curve was used, Lancaster reduced grades and widened pavement. The use of reinforced-concrete bridges, combined with masonry guard rails, guard walls, and retaining walls brought together the new with the old - the most advanced highway structures with the tried and tested. In building the HCRH, Lancaster artfully created an engineering achievement sympathetic to the natural landscape.⁵

In the days before the formation of a comprehensive state highway plan, Multnomah, Hood River, and Wasco counties cooperated, sometimes unwillingly, with the newly-formed Oregon State Highway Commission (1913) in constructing the HCRH. Initially a group of recently elected Multnomah County commissioners, strong supporters of the proposed route, resolved that the highway commission take charge of its road building activities, with access to \$75,000 in county tax revenues. Soon crews surveyed the route through Multnomah County and constructed one mile of road.

Boosters stumped for the route's completion to the Hood River County line. Local clubs sent out men and boys for weekend work parties to show public support for the undertaking. One photograph from the period, depicts work parties with picks and shovels in hand and placards such as "Gang No. 7, Portland Ad Club, Stalwarts," or "Gang No. 3, Portland Realty Board, We will ROCK the Earth." The highway received much patronage, although some citizens were less than enthusiastic about its construction. Opponents showed their views with placards declaring, "I WON'T WORK, To Hell With Good Roads, We Don't Own Autos." Many "mossbacks" had no use for good roads and were satisfied

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traveling the network of rutted, narrow, steeply-graded backwoods trails. Nevertheless, the public generally supported the highway's construction. Multnomah County Commissioners levied a direct tax sufficient to fund road building to the Hood River County line, and subsequently, the people voted a \$1 million bond issue to pave the road with asphalt.⁶

Other counties similarly supported this scenic highway innovation. In 1914, Hood River County voters approved the sale of \$75,000 in bonds to initiate their portion of the road's construction. Finally, in 1915, Wasco County commissioners financed a survey to locate the route through their jurisdiction. By 1916, though, the state highway commission was reorganized and given a greater mandate over state highway construction, taking much of it out of local hands. Passage of the Federal Aid Road Acts of 1916 and 1921 gave the Oregon State Highway Commission matching funding to complete the HCRH through Wasco County, and eventually to complete the route to its eastern terminus at Pendleton, in Umatilla County, by the early 1920s. At the same time, the state, working with counties west of Portland, completed another portion of the Columbia River Highway to the sea at Astoria. Eventually it became part of the national highway system and was designated part of U.S. 30.⁷

By the late 1930s, construction of Bonneville Dam, a New Deal project aimed at providing flood control on the Columbia River and generating electricity, caused a realignment of a portion of the Historic Columbia River Highway near Tooth Rock and Eagle Creek, in eastern Multnomah County. It was evident that the old highway was too outdated to provide safe, efficient travel for modern motor traffic. By 1954 it was bypassed in its entirety from Troutdale to The Dalles by a new water-level route. This new road was subsequently upgraded to a four-lane divided roadway and eventually renamed Interstate 84. Only portions of the old route remained as a reminder of its early modern highway engineering accomplishments.

TOOTHROCK AND EAGLE CREEK VIADUCTS

As locating engineers on the Historic Columbia River Highway neared the eastern end of Multnomah County they encountered perhaps some of their greatest natural obstacles. Even though they had already laid out the route through the difficult "Waterfalls Section," dropping several hundred feet from Crown Point to Latourell Falls, and then over several bridges and viaducts, the outcropping behind Tooth Rock, a small "tooth-shaped" pillar, presented itself as one of the greatest obstacles to continuing the road to the east.

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American Indians believed that the promontory was the southern abutment of the mythical Bridge of the Gods, part of the great divide of the Cascade Range spanning the present path of the Columbia River. Modern geologists see it as a cliff immediately downstream and across the river from remnants of the Cascade landslides of about A.D. 1260. This landslide deposited a $\frac{1}{2}$ cubic mile of material from the river's northern shore into the river and diverting its flow a mile to the south, eventually damming the river and creating a natural barrier. Eventually the lake behind the slide broke through, creating the rapids later known as the Cascades of the Columbia. For early Oregon Pioneers, the outcropping behind Tooth Rock was a barrier to overland travel to Portland as much as the Cascades were a barrier to river traffic.⁸

In order to maintain a maximum 5 percent grade and a minimum 200' turning radius on the Historic Columbia River Highway, which were the standards agreed upon at the road's inception, locating engineers saw no alternative in overcoming the bluff other than "hanging" the road around it. The easiest, but by far the most expensive alignment alternative was to cut down the rock slope to form a wide ledge to carry the highway around the promontory. It involved time-consuming and costly drilling and blasting basalt from the outcropping, some 200' above the Columbia and the Oregon-Washington Railroad and Navigation Company (OWRN) main line at the river's edge. Another alternative might have been a tunnel, as was used at Oneonta Gorge (HAER No. OR-36-L), or later at Mitchell Point (HAER No. OR-36-R). As a compromise, the highway department cut a 12' ledge into the cliff side, or half as wide as the needed roadway, and for the other 12' relied on sections of half viaducts.

DESIGN AND DESCRIPTION

Either K. P. Billner, or his colleague and successor, Lewis W. Metzger, designed the Toothrock and Eagle Creek viaducts in 1915. Both were accomplished and talented draftsmen who worked under the direction of Oregon State Bridge Engineer Charles H. Purcell. They were accomplished engineers who had created all the bridges constructed on the HCRH up to this point. They were accustomed to difficult problems and solved them with many one-of-a-kind structures.⁹

Bids were opened on May 3, 1915 for the Toothrock and Eagle Creek viaducts. The outcome is unknown, for construction files no longer exist, but it is highly likely that one of two Portland firms built these viaducts. Both the Pacific Bridge Company and The Construction Company had already completed all the bridges

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and viaducts constructed in Multnomah County on the Historic Columbia River Highway in 1914.

For a distance of about 224', the highway skirted around Toothrock on half-viaducts and a ledge. The engineers designed two reinforced-concrete structures 12' wide, of deck girder spans, supported on the outside of the roadway on concrete columns carried down the cliff face, and on the inside by the solid rock roadbed. Floor beams were carried on one side by the girder system and on the other in notches cut out of the cliff. Because the half-viaducts permitted construction of 12' of the 24' roadway out of the basalt cliff, they greatly reduced excavation costs.¹⁰

The portion of the structure west of the point itself is known specifically as Toothrock Viaduct, while the portion east of the point is known as Eagle Creek Viaduct. The real differences between them were the railing treatments and the span lengths. Designers of the HCRH, including Lancaster, were very aware of the need to construct an economical, efficient road, but they never lost sight of their belief in the need for aesthetic considerations in its design. On the Toothrock Viaduct, the railing details consisted of a concrete spindle and cap arrangement as seen on other Historic Columbia River Highway structures, namely, Latourell Creek Bridge, Shepperds Dell Bridge, and Moffett Creek Bridge. The somewhat fragile looking railing contrasted well with Toothrock's rugged appearance. On the Eagle Creek Viaduct, designers used a rubble masonry rail with semicircular drainage cutouts and a screeded concrete coping. It complimented the surrounding landscape and continued without interruption the adjacent masonry guard rails and retaining walls. Its basalt materials blended well in color and texture with the natural surroundings; the rock likely came from a nearby quarry.

An additional component of the Toothrock and Eagle Creek Viaducts was the inclusion of a pedestrian observatory at the midpoint, between the two structures. Here, masonry parapet walls and concrete benches provide motorists with an ideal location to stop on the roadside to take in majestic vistas of the Columbia Gorge from a high vantage point. It was appropriately named "Eagle's Nest" because of its tree-top perch.

REPAIR AND MAINTENANCE

Maintenance records for Toothrock and Eagle Creek viaducts no longer exist. Plans for construction of Bonneville Dam in 1933 called for backwaters that would flood the OWRN main line near Eagle Creek. The U.S. Bureau of Public Roads decide to

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reroute the tracks over portions of the HCRH, creating the need to realign the highway with a 837' tunnel through the outcropping behind Tooth Rock and new bridge over Eagle Creek. Construction of the tunnel's east portal included cutting away a portion of the HCRH east of the Eagle Creek Viaduct and replacing it with a temporary 90' timber truss bridge. Once the new structures opened in 1937, the Toothrock and Eagle Creek viaducts were closed.¹¹

In the past two years, an Oregon Department of Transportation mason has been repairing both viaducts and reconstructing Eagle's Nest as part of a departmental rehabilitation program for portions of the HCRH that were abandoned in the 1930s and 1950s. He has recast spindles on the Toothrock Viaduct and rebuilt masonry walls on the Eagle Creek Viaduct. Plans call for a new span above the Tooth Rock Tunnel's east portal to connect the eastern end of Eagle Creek Viaduct with the HCRH as it approaches Eagle Creek Bridge from the west.

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ENDNOTES

¹For good syntheses of the Pacific Northwest good roads' movement, see John Kevin Rindell, "From Ruts to Roads: The Politics of Highway Development in Washington State" (M.A. thesis, Washington State University, 1987) and Hugh M. Hoyt, Jr., "The Good Roads Movement in Oregon, 1900-1920" (Ph.D. diss., University of Oregon, 1966); Oral Bullard, *Lancaster's Road: The Historic Columbia River Scenic Highway* (Beaverton, OR: TMS Book Service, 1982): 31; Ronald J. Fahl, "S. C. Lancaster and the Columbia River Highway: Engineer as Conservationist," *Oregon Historical Quarterly* 74, no. 2 (June 1973): 112.

²Fahl, "S. C. Lancaster and the Columbia River Highway," 105-07.

³John Arthur Elliott, "The Location and Construction of the Mitchell Point Section of the Columbia River Highway" (C.E. thesis, University of Washington, 1929): 3.

⁴Samuel C. Lancaster to Amos S. Benson, 7 February 1914, folder "Multnomah County, 1914," box 4, RG 76A-90, Oregon State Archives, Salem.

⁵Dwight A. Smith, "Columbia River Highway Historic District: Nomination of the Old Columbia River Highway in the Columbia Gorge to the National Register of Historic Places, Multnomah, Hood River, and Wasco Counties, Oregon" (Salem, OR: Oregon Department of Transportation, Highway Division, Technical Services Branch, Environmental Section, 1984): 3.

⁶Ronald J. Fahl, "S. C. Lancaster and the Columbia River Highway: Engineer as Conservationist," *Oregon Historical Quarterly* 74, no. 2 (June 1973): 111; Samuel C. Lancaster, "The Revelation of Famous Highways: A Symposium," in *American Civic Annual* (n.p., 1929): 109.; see photograph in the Oregon Historical Society collection, negative no. 38744; C. Lester Horn, "Oregon's Columbia River Highway," *Oregon Historical Quarterly* 66, no. 3 (September 1965): 261.

⁷*Second Annual Report of the Engineer of the Oregon State Highway Commission* (Salem, 1916): 26-30.

⁸John Eliot Allen, *The Magnificent Gateway: A Layman's Guide to the Geology of the Columbia River Gorge* (Forest Grove, OR: Timber Press, 1979): 52-56, 98.

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⁹Most authorities write Tooth Rock as two words, but Oregon State Highway Department correspondence and other official documents use the contracted one-word form "Toothrock" in reference to the viaduct, thus "Toothrock Viaduct."

¹⁰Fred Lockley, *History of the Columbia River Valley from The Dalles to the Sea* (Chicago: S. J. Clarke Publishing Co., 1928): 840.

¹¹The Oregon State Highway Department Bridge Section assigned contract no. 50 to the Toothrock and Eagle Creek viaducts sometime in the late 1910s or early 1920s, yet no maintenance records exist for these structures. See also Henry W. Young, "Construction Methods on Tooth Rock Tunnel," *Roads and Streets* 80, no. 2 (February 1937): 70.

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- Fahl, Ronald J. "S. C. Lancaster and the Columbia River Highway: Engineer as Conservationist," *Oregon Historical Quarterly* 74, no. 2 (June 1973): 101-44
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- Horn, C. Lester. "Oregon's Columbia River Highway," *Oregon Historical Quarterly* 66, no. 3 (September 1965): 249-71.
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Young, Henry W. "Construction Methods on Tooth Rock Tunnel,"
Roads and Streets 80, no. 2 (February 1937): 68-70.

DATA LIMITATIONS

Research information on the Toothrock and Eagle Creek viaducts was limited to departmental correspondence, reports, and a few trade journal articles. These structures were closed in the late 1930s and were not maintained from that time. Maintenance files for these structures no longer exist.

APPENDIX - VIADUCTS

Viaducts, often bridges resting on a series of narrow reinforced-concrete piers or bents and carrying a road over a valley, cleft, or concavity, have many forms on the HCRH. They were used primarily to keep construction costs down when alternative road alignments meant expensive grading or "developing distance" by building extra lengths of road to maintain a grade no greater than 5 percent.

FULL VIADUCTS

Mitchell Point Viaduct (HAER No. OR-36-R)

At the west approach to Mitchell Point Tunnel (HAER No. OR-36-R), engineers designed a 193'-0" reinforced-concrete slab and girder type viaduct. The viaduct was supported on sets of columns 15'-6" apart center-to-center, and 32'-0" longitudinally to carry the HCRH from a cliff cut over a talus slope concavity to a tunnel portal. Locating this structure was difficult because the talus slope below was unstable, making it hard for crews to locate firm footings for bents. Excavations were done by hand and proved very time consuming.

The Mitchell Point Viaduct was a fairly nondescript structure with precast railing panels. Yet it was functional with an understated aesthetic component that prepared motorists for entering the Mitchell Point Tunnel, which some have called the most inspiring part of the HCRH. The tunnel and viaduct were completed in 1915. A new water-grade route for U.S. 30, mostly built on fill from river dredging, was completed from Portland to The Dalles by the early 1950s. Oregon highway officials closed Mitchell Point Tunnel and consequently the adjoining viaduct in 1953 and backfilled the tunnel in an attempt to stabilize the basalt formations of Mitchell Point. In 1966, as part of a widening project to upgrade the water-level route to a four-lane interstate highway, a large portion of Mitchell Point, including the tunnel and viaduct, were destroyed.

West and East Multnomah Falls Viaducts (HAER Nos. OR-36-G & OR-36-J)

The road alignment immediately west and east of Multnomah Falls runs between the Oregon-Washington Railroad and Navigation Company main line and a steep mountainside. There were no realistic alternate alignments for the Historic Columbia River Highway here because the railroad tracks ran next to the river's edge. Engineers avoided marring the natural landscape wherever possible and often saw the best solution for creating satisfactory alignments was to construct the road on fill behind solid dry masonry retaining walls. However, for the West and

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East Multnomah Falls Viaducts they needed to bridge very steep and unstable slopes that were susceptible to slide action. Even minimal cutting and filling at the toe of these mountainsides, held together by underbrush and timber, might cause rock and debris avalanches to cover the roadway and, probably more importantly, block the railroad's main line.

The West Multnomah Falls Viaduct is 400' in length and consists of twenty 20' reinforced-concrete slab spans. The deck is supported by two parallel rows of 16"-square columns, or bents, 17'-6" apart. The corners were chamfered, both for aesthetic purposes and to eliminate sharp corners prone to chipping. This shape also facilitated removing the formwork. Roadway width is about 18'. The design engineer K. P. Billner included inclined struts between the footings of the inside and outside piers because he saw a need to guard against settling of the upper columns and to achieve greater structural stability. With confidence he believed that they could "carry the weight of the structure." The East Multnomah Falls Viaduct is identical to the West Multnomah Falls Viaduct, except that it is 860'. Both were completed in 1914.

HALF-VIADUCTS

Engineers designed half-viaducts for several locations on the highway also to skirt hillsides. They were constructed much like viaducts with unequal-length columns, except that the inside bents consisted only of footings and the inside elevations were anchored into the hillsides or masonry walls. Because of the half-viaducts' inconspicuous design, motorists often did not realize that they were not traveling on regular highway pavement with masonry guard rails.

Crown Point Viaduct (HAER No. OR-36-C)

The Crown Point Viaduct (HAER No. OR-36-C), completed in 1914, is 560' and consists of twenty-eight 20' reinforced-concrete deck slabs. It was a half-viaduct designed to create a 7' sidewalk and curb adjacent to a tightly curved section of the HCRH on a high basalt promontory. Its design also included a 4' concrete outer railing and concrete light standards to illuminate the point at night. Samuel Lancaster saw Crown Point, originally called Thor's Heights for the Norse god of thunder, as a destination for motorists. Here they could see a panoramic view of the Columbia River Gorge and surrounding landscape, and begin their travels through the "waterfalls" section of the route.

Ruthton Point Viaduct

Ruthton Point Viaduct, completed in 1918, is a 50' structure consisting of three reinforced-concrete deck girder spans (20',

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20', and 10') carrying the highway near a promontory west of Hood River. It used a simple standardized concrete railing panel and cap. It was bypassed when the new water-level route for U.S. 30 was completed in the early 1950s. Since then it fell into disrepair, but in the early 1990s, as part of an Oregon Department of Transportation restoration project on the HCRH, Ruthton Point Viaduct was reconstructed to be part of a pedestrian and bicycle accessible trail along once abandoned sections of the route.

Rock Slide Viaduct

The 34' Rock Slide Viaduct, completed in 1920, lies a short distance west of the Mosier Twin Tunnels. The viaduct was probably necessary, rather than a dry masonry retaining wall, because of the unstable nature of the basalt slope. The viaduct's uninterrupted roadway surface and the continuous arched rubble parapet railing made it difficult for travelers to identify the structure from the road. In the late 1940s and early 1950s, the Oregon State Highway Department completed a water-level route for U.S. 30 along the Columbia River. In 1953, it finished the section between Hood River and Mosier and closed the Mosier Twin Tunnels. The portion of the HCRH from Hood River to the tunnels' west approach, including Rock Slide Viaduct, became part of Hood River County's extensive road system.